Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

February 28, 2013
NOC-AE-13002974
File No.: G25
10 CFR 50.73
STI: 33661623

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

South Texas Project
Unit 2
Docket No. STN 50-499
Licensee Event Report 2-2013-001
Unit 2 Manual Reactor Trip Due to Dropped Rods M8 and D8

Pursuant to 10 CFR 50.73, STP Nuclear Operating Company (STPNOC) submits the attached Unit 2 Licensee Event Report (LER) 2-2013-001 to address the Unit 2 Manual Reactor trip that occurred on January 4, 2013.

This condition is considered reportable under 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section.

This event did not have an adverse effect on the health and safety of the public.

There are no commitments contained in this LER. Corrective actions will be implemented in accordance with the STP Corrective Action Program.

If there are any questions on this submittal, please contact either Jamie Paul at (361) 972-7344 or me at (361) 972-7800.

Dennis L. Koehl
President and CEO/CNO

JLP

Attachment: LER 2-2013-001

cc:
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NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO, 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53). U.S. Nuclear Regulatory Commission, Washington. DC 20555-0001, or by internet e-mail to Infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs. NEOB-10202. (3150-1104), Office of Management and Budget. Washington. DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
South Texas Unit 2	05000499	1 OF 4

4. TITLE

Unit 2 Manual Reactor Trip Due to Dropped Rods M8 and D8

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	N/A
01	04	2013	2013	001	0	02	28	2013	N/A	N/A

9. OPERATING MODE

1

10. POWER LEVEL

100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Jamie Paul, Licensing Supervisor	361-972-7344

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	AA	HS	G223	Y					

14. SUPPLEMENTAL RESPONSE EXPECTED

☐ YES (if yes, complete 15. EXPECTED SUBMISSION DATE) ☑ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

At 07:05 on 1/4/2013, Unit 2, while at 100% power, commenced surveillances 0PSP03-RS-0004 and 0PSP03-RS-0001 to satisfy the monthly requirements of Technical Specification 4.1.3.1.2. and to demonstrate the shutdown and control rods are Operable by movement of at least 10 steps in any one direction.

During testing, two rods on shutdown bank E (SBE) dropped to the bottom of the core and a manual reactor trip was required. The dropped rods on SBE occurred while inserting shutdown bank C (SBC) rods in 6 steps. After SBE rod M-8 dropped, rod motion was stopped. While validating the dropped rod, a second rod, D-8, in SBE dropped. At 09:41, once both dropped rods were validated by diverse indications of power, flux, and rod positions, a manual reactor trip was performed. Troubleshooting identified the problem as high resistance on Rod Holdout Mode Selector (RHMS) switch contacts in Rod Control Power Cabinet SCDE when the contacts should have been closed. This blocked the multiplexing signal to the SBE Stationary Regulation card resulting in dropped rods.

This condition is considered reportable under 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph 10 CFR 50.73(a)(2)(iv)(B). There were no personnel injuries, no offsite radiological releases, and no damage to safety-related equipment associated with this condition. This condition did not have an adverse effect on the health and safety of the public.

I. DESCRIPTION OF EVENT

A. REPORTABLE EVENT CLASSIFICATION

This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section.

B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

South Texas Project (STP) Unit 2 was in Mode 1, with Reactor Power at approximately 100%.

C. STATUS OF STRUCTURES, SYSTEMS, AND COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

No structures, systems, or components were inoperable at the start of the event that contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT

At 07:05 on 1/4/2013, Unit 2, while at 100% power, the control room commenced 0PSP03-RS-0001 "MONTHLY CONTROL ROD OPERABILITY", and 0PSP03-RS-0004 "CONTROL ROD OPERABILITY (6 AND 10 STEPS)". Surveillances 0PSP03-RS-0004 and 0PSP03-RS-0001 test the shutdown and control rods not fully inserted in the core in order to satisfy the monthly requirements of Technical Specification 4.1.3.1.2. and also provide instructions for demonstrating the shutdown and control rods not fully inserted in the core are Operable by movement of at least 10 steps in any one direction.

During testing, two rods on shutdown bank E (SBE) dropped to the bottom of the core and a manual reactor trip was required per 0POP04-RS-0001, "CONTROL ROD MALFUNCTION". The dropped rods on SBE occurred while inserting shutdown bank C (SBC) rods in 6 steps. When SBC demand reached 255, one rod in SBE dropped (M-8) while the rest of the rods in SBE transitioned from 258 to 252/246 on Digital Rod Position Indication (DRPI). Rod motion was stopped and while validating the dropped rod, a second rod in SBE dropped (D-8). At 09:41, once both dropped rods were validated by diverse indications of power, flux, and rod positions, a manual reactor trip was performed.

This event resulted in a reactor trip from 100% power. The Unit was stabilized in Mode 3 with all systems necessary to maintain shutdown conditions, remove decay heat, control the release of radioactive material, and mitigate the consequences of an accident available.

Troubleshooting identified that the problem was isolated to the Rod Holdout Mode Selector (RHMS) switch in Rod Control Power Cabinet SCDE. This is a five-position, seven deck rotary Grayhill switch used to interface with the Rod Holdout Sequencing card and other power cabinet components to accomplish the rod lockout function for rapid refueling. Switch Pin 7 to common C2 on deck F was found to have a high resistance (~300Mohms) while in the "OFF" position.

The Rod Holdout Mode Selector switch in Rod Control Power Cabinet SCDE was replaced. To address extent of condition in Unit 2, the four other Rod Holdout Mode Selector switches in the other Rod Control Power Cabinets were tested.

E. METHOD OF DISCOVERY

The two dropped rods on shutdown bank E requiring a manual reactor trip were self-revealing.

II. EVENT-DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

All required safety systems responded as expected except that one of two Nuclear Instrument Source Range detectors, N32, did not energize automatically. This was identified and the function performed manually. In addition to failing to automatically energize, the source range audio count rate on N32 also failed to function. These conditions have been entered into the Corrective Action Program.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

N/A

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

There was no impact to radiological safety, safety of the public, or safety of station personnel during this event.

The Incremental Conditional Core Damage Probability (ICCDP) for the Reactor Trip in Unit 2 on 1/4/2013 is 1.12E-07. The resulting Incremental Conditional Large Early Release Probability (CLERP) is 5.92E-08.

III. CAUSE OF THE EVENT

The cause of this event has been determined to be high resistance circuit on the RHMS from the C (common) contact in switch position 7 on deck F due to contamination. Even though offsite failure analysis did not reproduce the high resistive contact nor did it find evidence of contamination that could have caused this condition, enough evidence exists from other failure analysis and industry experience to conclude that contamination is the cause.

The cause of this contamination could be due to:

- The low current that flows through these contacts is not enough to burn through corrosion/carbon deposits that builds up on the contacts over time.
- Solder flux on contact surfaces.
- Grease or other contaminants.

IV. CORRECTIVE ACTIONS

Corrective actions will be implemented in accordance with the STP Corrective Action Program. The Rod Holdout Mode Selector switch in Rod Control Power Cabinet SCDE was replaced. Corrective actions to prevent future failures will include either a design change to address the vulnerability associated with the RHMS switch contacts or replacement of existing switches with newly manufactured switches.

V. PREVIOUS SIMILAR EVENTS

There have been no similar reportable events at STP within the last three years. The Rod Holdout Mode Selector (RHMS) switches in the Rod Control Power Cabinets interface with the Rod Holdout Sequencing card and other power cabinet components to accomplish the rod lockout function for rapid refueling. There are no previous similar industry events as South Texas Project (STP) is the only plant that uses rapid refueling.

VI. ADDITIONAL INFORMATION

N/A